

## CLAIMS

1. A method for determination of residual stresses in an investigation area of an object by real-time optical holographic interferometry technique, in which at the beginning a hologram of the investigation area of the object is registered in its initial state, followed by a release of the residual stresses in a small region of the investigation area, before the interferogram of the investigation area is formed from which one can determine the normal components of the surface displacement in a point at the boundary of the region with released residual stresses, which in turn can be employed to calculate the released residual stresses by means of theoretical expressions (1) and (2), characterized in that the release of the residual stresses is performed by exposing the surface at the small region of the investigation area of the object to an electric high-current pulse.
2. A method according to claim 1, characterized in that the electric high-current pulse has a rectangular shape and has pulse parameters in the range of; pulse amplitude 1.5-20 kA, pulse duration  $10^{-6}$  -  $2 \cdot 10^{-1}$  s, and recurrence frequency 0-100 Hz.
3. A method according to claim 2, characterized in that in the case of aluminium objects, the electric high-current pulse has an amplitude of 2 kA and duration of 0,15 s.
4. A device for performing real-time non-destructive measurements of residual stresses in an investigation area of an object by use of the optical holographic interferometry technique, where the device comprises an optical block which includes a source of coherent light, a holographic interferometer and a registering medium, a block for releasing residual stresses in a small region of the investigation area of the object, and means for fixing the optical block to object, characterized in that the means for release of residual stresses is an electronic device (18, 19) which is integrated in the optical block and which can move between an upper retrieved position and a lowered position where it establishes electrical contact with the investigation area of the object in order to deliver a high-current electric pulse to the surface of the object at a small region (14) of the investigation area.
5. A device according to claim 4, characterized in that the part of the electric current supply electrode which is in contact with the investigation surface of the object is shaped as a half-sphere

with radius in the range of 1,5-5 mm.

6. A device according to claim 5,  
characterized in that the means for release of residual stresses comprises:
- 5       - a generator of high-current rectangular pulses, and  
       - electric current supply electrode with clamping device which is electrically  
connected to the generator, and which provides the passing of an electric high-  
current rectangular pulse through the junction between the supply electrode and  
surface at the investigation area of the object for an "dislocation" release of  
10 residual stresses.
7. A device according to claim 6,  
characterized in that the electric current supply electrode connected with the  
generator is able to provide an electric high-current pulse with rectangular shape to  
the surface of the investigation area of the object with parameters in the range of;
- 15 pulse amplitude 1.5-20 kA, pulse duration  $10^{-6}$  -  $2 \cdot 10^{-1}$  s, and recurrence frequency  
0-100 Hz.
8. A device according to claims 5-7,  
characterized in that it has means for introducing an optical wedge into the  
pathway of the reference beam pathway for the purpose of determining the sign of  
20 the normal component of surface displacement.